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Information Disclosure Citation
Statement of Relevance

Current and traditional methods for computer-generated environments typically utilize a pre-established environment. Such pre-established environments (to include components) are created in their entirety prior to use. (This could be from an existing file or by being generated just prior to use.) Such pre-existing environments are inherently limited by the opportunity and resource costs associated with extensive data handling requirements: the ability to create and retain a certain amount of environment, features, objects and associated details; the ability to store and recall an original environment and a changed environment; and the ability to maintain the environment in real-time interactions. The practical limitations of these prior art methods can lead to recognizable and repeating patterns, which may adversely affect the objectives for using a realistic computer-generated environment. Similar limitations would apply to the level of detail possible in prior art methods. For example, during anti-terrorist training the detection and deactivation of an explosive device wired into the electrical system of a specific vehicle might require that the interior wiring of that vehicle be presented in great detail to accomplish the purpose of the training. If you then have a large garage full of vehicles, it would be impractical, if not impossible, under prior art methods to create and maintain so many vehicles in such detail.

Because of the extensive amount of data being generated, maintained, stored, and manipulated, these prior art methods have high opportunity and resource costs which result in computer-generated environments that are restricted in one or more of the following ways: the size of the environment; the quantity, variety, and detail of available components; and the allowable interactions between users and components.

The present invention overcomes these prior art limitations with a unique method for as-needed, pseudo-random, computer-generated environments. The as-needed step allows for that area of the environment actually in use to be instantiated only as needed and only for as long as it remains in use. (Unnecessary areas will lapse and will not be maintained.) A previously instantiated area may be exactly reinstantiated later using the same original initial conditions. In addition, any user-initiated changes to the instantiated area allowed by the specific application may be retained. This allows, at a later time, the exact reinstantiation of the changed area. The as-needed step allows for a potentially infinite environment (as to size and detail) while minimizing the opportunity and resource costs to create and store such an environment. The pseudo-random step allows any degree of creative freedom or control in the presentation (e.g., size, shape, location, orientation, movement, density, transparency etc.) of the environment and components within any required rule sets. If recognizable objects and features were desired, certain minimal rule sets would be required regarding the generation of those objects and features. Most applications will impose geo-specific limitations on

the presentation of components, while allowing for the degree of randomness most closely approximately a real-world environment. An optional step would combine the concept of "nested fidelity" with the as-needed and pseudo-random steps. The nested-fidelity step allows for successively greater levels of detail to be given to components only as needed.

U.S. Pat. No. 6,128,019 issued on October 3, 2000, discloses a method for creating a large-scale synthetic environment simulation which can be used in real-time. The disclosed method provides for a varying level of detail by regions of interest, for fully establishing only desired regions of the environment, and for updating individual components without recompiling the whole environment. This varying level of detail applies to a fixed range of detail which is available to the entire environment. Within this limited range of detail, priority is given to maximizing the detail in those regions of the greatest interest.

This patent does not teach or disclose the use of pseudo-random selection (randomness within preset rules) of components and details to match the variety and randomness of real world conditions. This lack of pseudo-randomness results in simulated environments which might become predictable or are limited to only what is expected. The level of detail available for any given component must be essentially unlimited if the intent is to replicate a real world object. The method of this patent does not teach or disclose the use of continuously increasing levels of detail being given to components via pseudo-random

selection and on an as-needed basis. The cited patent does provide for varying the level of detail on a priority basis; however, it does not teach or disclose the much more efficient method of completely disregarding uneeded regions and generating only those regions needed and only for as long as they are needed.

U.S. Pat. No. 4,835,532 issued May 30, 1989, teaches a unique method of mapping a digital input image to a viewing plane in both linear and perspective modes from a library of images and with sufficient speed to allow for real-time analysis. This patent includes a computer-generated randomness factor. This patent is cited as one of several cumulative references to demonstrate the variety of current apparatuses and means which may be employed by the method of the present invention.

U.S. Pat. No. 6,084,587 issued July 4, 2000, teaches a virtual reality interaction method employing haptically created and manipulable objects constructed using specified parameters. This patent is cited as one of several cumulative references to demonstrate the variety of current apparatuses and means which may be employed by the method of the present invention.

U.S. Pat. No. 6,054,991 issued April 25, 2000, teaches a method for modeling a player's movement and position within a low-cost virtual reality system. While the patent acknowledges the need for detail simulations to include the interior of buildings, the objectives of the patent appear limited to position and movement within a virtual reality system. This patent is cited as one of

several cumulative references to demonstrate the variety of current apparatuses and means which may be employed by the method of the present invention.

U.S. Pat. No. 6,050,822 issued April 18, 2000, discloses an electromagnetic locomotion platform system which allows for the sensory simulation of human-like movement within a virtual reality system. This patent is cited as one of several cumulative references to demonstrate the variety of current apparatuses and means which may be employed by the method of the present invention.

U. S. Pat. No. 6,241,609 issued June 5, 2001, teaches the use of a rule set to define or limit the conditions related to certain interactions. This patent is cited as one of several cumulative references to demonstrate the variety of current apparatuses and means which may be employed by the method of the present invention.

U. S. Pat. No. 6,275,227 issued August 14, 2001, demonstrates a typical exchange between the user application and the processing computer. This patent is cited as one of several cumulative references to demonstrate the variety of current apparatuses and means which may be employed by the method of the present invention.

The above cited patents contain numerous references which further document the wide range of

cumulative prior art that may be employed by the method disclosed by the present invention. The method disclosed by the present invention is a unique process for a computer-generated, as-needed, pseudo-random environment. This method may employ or combine one or more of these various prior art apartuses and means in a specific application. Alternately, this method may be utilized independently from any such prior art for a specific application.

On June 13-15, 2000, a working prototype of the method was displayed at an Infantry Commander's Confrence at Fort Benning, Gerogia. No written literature was provided. Verbal descriptions of the prototype were given by the inventor. However, these descriptions were not made to those skilled in the art and were not sufficient to allow one skilled in the art to practice the invention.

An undated paper entitled: Representation of Urban/Suburban Sprawl Through Real-Time Generation of Pseudo-Random Cultural Feature Entities, was presented during a November 27-30, 2000, International/Intra-service Training, Simulation, and Education Conference in Orlando, Florida. A prototype of the invention was displayed at the conference. A brief, undated abstract (attached to the above paper) was submitted to the paper selection committee on or about April 2000. No known publication of the abstract or paper occurred prior to the conference.

Neither the applicant nor his undersigned representative is aware of additional prior art which teaches or discloses the applicant's invention or which would render the invention obvious or unpatentable. Neither

the applicant nor his undersigned representative is aware of any other information which, in their opinion, is material to patentability and which is not cumulative to information already of record in the application, or which further establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim.

Respectfully,

Dayn Thomas Beam

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